

**SESSION II**  
**EDUCATION AND TRAINING**

**SESSION CHAIRPERSONS:**

**Ms. Miriam Ortiz, HQ AFCEE/EOP**  
**Mr. Christopher Paoletti, EA Engineering Science &  
Technology**

**Environmental Services for Community Relations Program Support  
in Pollution Prevention Training and Education**

Barbara Zeman  
Charlotte Trahan  
Earth Tech  
1461 E. Cooley Drive, Ste. 100  
Colton, CA 92324  
(909) 424-1919  
bzeman@earthtech.com  
ctrahan@earthtech.com

MSgt. Mike Rogers  
HQ PACAF/CEVV  
25 E Street, Ste. D306  
Hickam AFB, HI 96853-5412  
(808) 449-7374  
rogersm@hqpacaf.af.mil

Thomas Moreland  
HQ AFCEE/EQ  
3207 North Road  
Brooks AFB, TX 78235-5363  
(210) 536-5303  
tom.moreland@hqafcee.brooks.af.mil

Pacific Air Forces (PACAF) installations are leaders in environmental compliance and pollution prevention (P2). PACAF supports the Air Force initiative to reduce compliance requirements through P2. Recognizing the importance of community awareness and support to the success of P2 initiatives, PACAF contracted Earth Tech, Inc. (Earth Tech), through the Air Force Center for Environmental Excellence (AFCEE), to support its P2 community relations program. The program targets a general audience, including base personnel, base residents, local community residents, and schoolchildren. Earth Tech conducted site visits to nine major PACAF installations in Alaska, Hawaii, Guam, Japan, and Korea to collect data, photographs, and video footage regarding P2 program activities. Additionally, personnel at Headquarters PACAF were interviewed to obtain command-wide statistics and information regarding program progress and future plans.

#### **PACAF's P2 COMMUNITY RELATIONS PROGRAM**

An important part of the community relations program is working with local communities to identify and take advantage of opportunities for the public and individual installation personnel to participate in P2 activities at work and at home. The individual installations foster community support and participation in P2 initiatives through recycling, household hazardous waste exchange, and a variety of events and projects throughout the year.

Hickam Air Force Base (AFB) hosts a visitor's center at their recycling location as part of their community awareness program. The center displays everything that is recyclable at Hickam AFB and also illustrates the environmental benefits derived from recycling. Step-by-step guides demonstrating how to set up office and household recycling programs are displayed on the center's bulletin boards.

Andersen AFB's "Wizard of Waste" instructs school-aged children in the benefits of recycling. Personnel in the Environmental Flight volunteer to visit the on-base schools as the "Wizard of Waste" to talk to school children about what can be recycled, why they should recycle, and how they can participate in the recycling program.

Eielson AFB participates in the Green Star Program, jointly established by the Anchorage business community, Alaska Center for the Environment, and the Alaska Department of Environmental Conservation's Pollution Prevention office. The program encourages local businesses to adopt environmentally sound business practices and creates a forum for exchange of ideas on cost-effective ways to reduce pollution. Participation requires adoption and circulation of a hazardous waste reduction policy, conducting internal assessments, providing incentives and training opportunities, and networking with other businesses to exchange information. Key elements of Eielson AFB's Green Star Program included implementing a Hazardous Materials Pharmacy (HAZMART), an Affirmative Procurement Program, and a Refuse Derived Fuel (RDF) facility. A Green Star was awarded to the base on 17 September 1996 during a presentation at the Fairbanks Chamber of Commerce luncheon.

**Earth Day.** A number of the PACAF installations sponsor special activities to celebrate Earth Day, typically in coordination with local communities.

- Misawa AB teams up with the local community to support Earth Day and the Japanese Green Day activities to promote P2 and the need for waste reduction. Activities have included the Misawa Fishing Port Clean Up, Oirase River/Gorge Clean Up, and a picture contest for local schools.
- In 1997, Anderson AFB personnel spent over 800 hours improving and cleaning up more than 7 miles of roads, 4 miles of beaches, and 2 miles of nature trails. Other activities included planting trees, cleaning up the base, and helping to clean up local villages and a wildlife refuge.
- Yokota Air Base (AB), Japan, has focused past Earth Day efforts on educating the youth in the community. Activities included composting demonstrations, a field trip to the Tokyo Metro Tama River Wastewater Treatment Plant, and the Tama River Clean Up. Community outreach includes setting up displays of environmental books and video tapes.

The second aspect of PACAF's P2 community relations program is to advertise to the on- and off-base community the techniques that PACAF is implementing in its daily operations that allow them to continue to support their defense mission while reducing pollution. Community relations efforts under this focus involve preparation of written and audio-visual materials that describe initiatives that have saved money and reduced use of hazardous materials and generation of hazardous wastes, or have helped conserve natural resources. Earth Tech's task was to support this aspect of the program by preparing fact sheets, a color brochure, and a video highlighting some of PACAF's successful P2 initiatives.

**Fact Sheets.** Earth Tech prepared four, 4-page, black-and-white fact sheets, which were provided to the P2 points-of-contact for general distribution at each of the nine major PACAF bases. Each fact sheet was developed around a specific theme, as follows:

- **What is P2?** To introduce the general reader to the principles and primary regulations and policies regarding P2. Addresses benefits of P2, the P2 hierarchy of Source Reduction - Recycling - Treatment - Disposal, and defines EPA-17 chemicals and ozone-depleting substances.
- **Municipal Solid Waste and Recycling.** Explains why we should recycle, and identifies types of materials that can be recycled. Summarizes initiatives at PACAF installations for recycling, provides suggestions for reducing waste, and describes actions that individual consumers can take to support recycling efforts.
- **Reducing Hazardous Waste Generation.** Defines hazardous waste and summarizes techniques that are being implemented at PACAF shops to reduce use of hazardous materials and generation of hazardous waste. Defines household hazardous waste (HHW) and provides suggestions for reducing and properly disposing of HHW.
- **Celebrate Earth Day.** Includes information about what PACAF installations historically and currently do to support Earth Day. Provides suggestions for Earth Day activities that communities and individuals can implement all year long.

**P2 Brochure.** This 16-page, full-color brochure summarizes P2 initiatives that are being implemented at PACAF installations. It highlights techniques in recycling, composting, hazardous materials purchase and distribution (HAZMART), household hazardous waste collection, corrosion control parts washers, solvent recycling, oil analyzers, antifreeze recycling, groundwater recharge, and pesticide reduction. The brochure also describes what PACAF is doing to educate and involve the on- and off-base communities in P2 activities.

**Promotional Video.** The 20-minute color video with voice-over narration demonstrates some of PACAF's P2 techniques. Using footage shot in shops, recycling centers, and at various other locations around the nine installations, the video highlights some of PACAF's innovative and cost-effective methods of reducing pollution. The narration is directed to a general audience to explain how PACAF is continually finding ways to reduce use of hazardous materials, generation of hazardous waste, and procurement and disposal costs in its day-to-day operations.

## **PACAF's P2 INITIATIVES**

Site visits to the P2 shops at nine PACAF installations provided a great deal of information about successful PACAF P2 initiatives. These initiatives are summarized in the following paragraphs.

### **Municipal Solid Waste**

- Hickam AFB established a state-of-the-art recycling center and saved over \$900,000 in disposal costs by diverting the waste stream from the local landfill. Hickam AFB also coordinated with the Honolulu Resource Recovery Venture (HPOWER) to have its non-recyclable, nonferrous, solid waste burned in their Waste-to-Energy facility. Through the combination of aggressive recycling and using waste-to-energy, the base was able to reduce its annual solid waste disposal from 17,587 tons to an equivalent of 2,254 tons in 4 years, a reduction of 87 percent.
- Elmendorf AFB implemented Project Gold Flag, a recycling initiative under which aerospace ground support equipment or parts scheduled for disposal are instead salvaged, rebuilt and then reused. This project saved over \$1,347,000 in disposal and acquisition costs in one year alone.
- Eielson AFB purchased an RDF Pelletizing Machine. The machine produces dense pellets from the solid waste; the pellets are burned as a coal substitute in the base's central heat and power plant. The installation saves over \$250,000 a year in waste disposal and fuel procurement costs. The base recently signed a Memorandum of Agreement (MOA) with the Fairbanks Borough; under the terms of the MOA, the base will be able to dispose of one ton of noncombustible waste for every two tons of combustible waste from the borough. In this win-win deal, the base will realize additional savings on waste disposal and fuel costs, and the borough will be able to prolong the life of the landfill.
- Elmendorf and Eielson AFBs use oil heaters and smart ash burners that burn used oil or solvent-contaminated rags and used absorbent materials to heat various storage and industrial facilities. The greatly reduced amount of material remaining after burning is tested and typically found to be non-hazardous and disposed of as municipal solid waste. The bases benefit from (1) reduced shipping and disposal costs for used oil and hazardous waste, (2) reduced heating costs, and (3) reduced depletion of fossil fuel resources.
- Many PACAF installations have purchased glass pulverizers, which pulverize glass into usable products, instead of sending it out for disposal. Pulverized glass leaves no sharp edges and can be used as fill material for road bases, golf course sand traps, and beaches, and can be used as an aggregate in concrete, mortar, and asphalt mixes. Use of the glass pulverizer helps reduce disposal costs for glass as well as purchase costs for the created products.
- At several PACAF installations, including Yokota AB and Elmendorf AFB, fluorescent light bulbs are also recycled. First, the bulbs are processed through a fluorescent tube disposal unit that crushes the glass. During this process, any mercury associated with the fluorescent tube is vacuumed into a filter, allowing the glass to be recycled with other glass products.
- All PACAF installations recycle at least part of their green and wood waste. Although these operations are not conducted for profit, recycling green waste saves on disposal costs and on the cost

of landscaping materials. By recycling and reusing these organic materials, waste previously disposed of in landfills is put to beneficial use in gardening and landscaping.

- PACAF installations supply various recycling bins for industrial and office areas as well as Military Family Housing areas. To make recycling easy and accessible for all, PACAF installations use a combination of curbside recycling in housing areas and centrally located recycling bins throughout the installations where base personnel can drop off their recyclables at their convenience.
- At Kadena AB, Japan, a manpower shortage and the high cost of recycling using a local contractor made it difficult to implement a cost-effective recycling program. However, the base recently signed an MOA with the Marine Corps under which the Marines collect recycling and operate Kadena's facility and equipment, and the two forces split the proceeds. Everyone benefits, including the environment.
- Recycling does not yet pay for itself at all PACAF installations; however, funds received from recycling activities can be used to offset the cost of implementing recycling programs or used to improve or develop quality of life projects. Examples of such projects include new playground equipment, recreational equipment, and a skateboard park.

#### **Hazardous Material/Waste Reduction**

- By implementing the HAZMART and eliminating stockpiles of hazardous materials in individual shops, PACAF has saved thousands of dollars in disposal costs. In the first 3 years that the HAZMART was operational, Andersen AFB reclaimed/reused 34,000 items valued at over \$214,000 and reduced their hazardous waste stream by 36 percent. Reissuing material saved Misawa AB over \$16,000 in acquisition and shipping costs in only one year.
- All PACAF installations have implemented a household hazardous materials exchange operation. The exchange area is typically located at the recycling center or self-help shop where base personnel may conveniently exchange household hazardous materials. Personnel who no longer have a need for various household hazardous materials such as household cleaners, pesticides, oils, lubricants, paints, thinners, and antifreeze, may bring these materials to the exchange so that they may be reused by other base personnel.

#### **Corrosion Control**

- At Andersen AFB, instead of randomly assessing the amount of paint to be used for vehicle painting and disposing of all leftover paint, the quantity of paint mixed is calculated for the size of vehicle being painted. All mixed paint must then be sprayed onto the vehicle; any surplus paint is sprayed inside engine compartments, fenders, wheel wells, and the vehicle frame. The base has begun to use less toxic, more environmentally friendly paints as well.
- When thinner that is used to clean the paint gun no longer does a satisfactory job, it is mixed with undercoating or non-slip paint as a reducer and is used during the undercoating process or on non-slip surfaces. Implementation of this new approach has resulted in an average annual reduction of over 2,700 pounds of waste paint and related materials. At Elmendorf AFB, the civil engineering paint shop has reduced its annual disposal of used solvent from approximately 200 barrels to about 5 by utilizing a solvent recycler. Osan AB eliminated 330 gallons of waste solvent per month with their solvent recovery system.
- Kadena AB in Japan uses an automated corrosion control system for non-nuclear munitions. Using latex paint, the system has reduced paint usage from 600 drums/year to 300 drums/year, saving Kadena over \$148,000 annually.

- All PACAF installations are converting from conventional spray paint systems to **High-Volume/Low-Pressure (HVLP) paint systems**. The newer paint guns have a transfer efficiency of approximately 60 percent, whereas the old guns had an efficiency of only 30 percent. Using these guns reduces paint procurement requirements - and paint emissions - by up to 50 percent because less paint is lost to overspray. Hickam AFB saved \$14,000 in the first year of using HVLP guns.
- At Eielson AFB, the aerospace ground equipment (AGE) shop has implemented the use of pre-cut adhesive numbers for labeling equipment rather than spray-painting stenciled numbers. By implementing this procedure, the AGE shop has reduced its use of paint and disposal of masking material by over 80 percent.

#### **Parts Washers**

- PACAF has implemented the use of parts cleaning machines that use an aqueous biodegradable cleaning agent to reduce the amount of chemicals used and hazardous waste generated. Before procuring a parts washer, Osan AB's Wheel and Tire Shop spent \$13,000 a year on solvent procurement and disposal. Now, instead of disposing of 200 gallons of waste every two months, the shops will be left with 10 to 20 gallons of waste sludge. Over the ten-year service life of the washer, Osan AB will save over \$140,000. The Eielson AFB Armament Shop reduced the amount of hazardous waste generated from cleaning parts by approximately 70 percent.
- Hickam AFB utilizes a closed-loop wash rack system at its motor pool facility for light-duty pressure cleaning operations. This system removes oil, grease, soils, and most other contaminants and automatically re-circulates the cleaned water for reuse. The system does not require use of a sanitary sewer or an oil/water separator. The system contractor provides ongoing maintenance and support.

#### **Oil Analyzers/Recycling**

- PACAF has implemented the use of engine oil analyzers to determine the condition of the oil to eliminate needless oil changes. Although used oil is either recycled or reclaimed for fuel at all PACAF bases, reducing oil changes reduces costs for contractor disposal and for purchase of virgin oil. The oil analyzer considers the lubricity, state of additive contents and contaminants, and viscosity of an oil sample. At Andersen AFB, the transportation squadron has instituted the use of a secondary filter in many of their vehicles to further extend the life of the oil.
- Several PACAF installations utilize oil filter crushers and drum compactors to reduce the bulk of material being disposed. The filter bottom is cut off, the filter casing and any metal components are crushed and recycled, and the filter is compacted to retrieve any used oil. Some PACAF installations also operate a 55-gallon drum compactor that reduces the bulk or area required to dispose of this material.
- All PACAF installations have implemented the use of antifreeze recycling units to reduce the amount and cost of antifreeze purchased and disposed. Typically, used antifreeze containing trace contaminants such as lead, iron, copper, and zinc is disposed of as non-regulated waste or as a hazardous chemical, depending on the local regulations. The recycler separates the contaminants, which are disposed of as hazardous waste, from the antifreeze, which can then be reused.
- Several PACAF installations recycle their aerosol paint cans. A simple attachment to a 55-gallon drum punctures the aerosol can to release the propellant and any residual paint. The paint is collected in the drum and disposed of once the drum is full. Because the propellant (which is what causes the cans to be classified as hazardous waste) has been released, the aerosol cans can be collected and recycled as scrap metal.

- Many PACAF installations, including Eielson AFB and Osan AB, have implemented the use of explosion-proof vacuum recovery systems to clean up accidental spills or releases that were typically cleaned up with the use of absorbent material. The machine collects the liquids, which can then be recycled and reused or disposed. The use of absorbent material and the cost to dispose these materials is significantly reduced.
- PACAF installations have implemented the use of media blasting machines to remove paint from aircraft, vehicles, and other equipment. Using a medium, such as plastic, that can be recycled and reused eliminates the use of hazardous chemicals previously used for removing paint. The medium used in the blaster can be reused until it no longer meets specification. Then, depending on the metal content of the residual medium, it is disposed of either as solid or hazardous waste. The amount of material disposed of from this process is significantly less than the large amounts of hazardous waste associated with use of chemical wipedowns.

#### **Pesticide Reduction**

- Hickam AFB is the first Air Force installation to utilize the Sentricon Bait Station method of eliminating termites. The base is using this system on a trial basis; however, preliminary results are very promising. Instead of applying hundreds of pounds of chemicals directly onto the ground, bait containing less than 1 ounce of a chemical active ingredient is placed into the station. This chemical does not come in contact with the environment and is not harmful to humans or animals; the termite brings the bait back to the colony and infects the entire colony.
- At Kunsan AB, weeds and other unsightly vegetation that grow on the protective revetments were typically controlled using herbicide applications. However, the base has begun sealing or capping the revetments using steel, concrete, or caulking. This method of control deters unsightly weed growth in the future, resulting in long-term cost savings and reduction of herbicide application.

#### **Groundwater Recharge**

- At Andersen AFB, storm water is directed to low-lying areas that contain groundwater-replenishing wells and channeled directly to the aquifer beneath the base to replenish the groundwater supply. Spill plans are in place to prevent the introduction of hazardous materials into these replenishing locations. Replenishing wells located in areas that are highly susceptible to possible receipt of spill material, for example, near flightline storm drainage areas, are being considered for closure to further reduce the possibility of groundwater contamination. By reintroducing storm water to the aquifer, the base is able to assure an adequate water supply to support mission needs.